CENTRAL INTELLIGENCE AGENCY
IN. ORMATION FROM
FOREIGN DOCUMENTS OR RADIO BROADCASTS

REPORT
CD NO.

50X1-HUM

COUNTRY USSR
SUBJECT Scientific - Road building machinery
HOW PUBLISHED Monthly periodical
WHERE PUBLISHED Moscow
DATE PUBLISHED Jun/Jul 1946
LANGUAGE Russian

DATE OF INFORMATION 1946
DATE DIST. 15 Apr 1949
NO. OF PAGES 4
SUPPLEMENT TO REPORT NO.

SOURCE Mekhanizatsiya Stroitel'stva, No 6/7, 1946. (FDB Per Abs 38T16 -- Translation requested.)

TYPES OF ROAD-BUILDING MACHINERY AVAILABLE IN NEAR FUTURE

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The tremendous tasks in the development of the national economy of the country defined in the Five-Year Plan involve extensive development of means of communication and in particular, the creation of a dense network of automobile roads, both trunk and rayon. This is a necessity for the planned distribution of the various branches of industrial and building manufacture and for the development of each kray's economy.

The main projects in road building in the near future will be: (1) repair and roads construction main and rayon; (2) repair and construction of auto and trunk highways of considerable length with various types of surfaces; and (3) repair and construction of improved rayon dirt roads with reinforcement of poor strips.

Moreover, much maintenance work is planned for various seasons, especially preparation for spring and autumn mud periods. This is important to maintain uninterrupted traffic and for the preservation of the roads.

The construction and repair of dense networks of roads in the various parts of the USSR will involve surmounting difficulties peculiar to each locale. In the north, continuous snowdrifts; in woods and bogs, the necessity for considerable work on road clearance and foundation reinforcement; in the case of rayon roads, the construction of wood surfaces; in the steppe zone, the absence of local building materials; in the hills, considerable rock work, the struggle with snowdrifts, avalanches and floods. But apart from these various peculiarities and difficulties, the time factor will be uppermost in importance always and everywhere. It determines the scale of demolition and new construction. Completion of work in a short time is possible only with extensive mechanization of road work, utilizing the available technology, and supplementing equipment with new road machines.

The Five-Year Plan envisages extensive mechanization of building operations such as earth work 60 percent, stone crushing 90 percent and concrete mixing 95 percent etc., by 1950.

The production of the latest road-building machines is provided for in the Five-Year Plan. This is assured by the creation of a specialized production base. In spite of this, however, it is necessary to plan for maximum utilization of the existing machines.

Designers must increase the maneuverability of the machines, providing at the same time for high productivity and sound construction.

Production of various cumbersome combine-type road machinery should not be overemphasized. These can be used effectively where good roads are available to transport them. The importance of trailers, which can be used on good roads only, must not be overestimated.

These are the basic requirements: mobility, roadworthiness, rapid starting, compactness, light weight, auto propulsion over long distances.

Since the requirements for national economy and for the army are identical, the systematic production of mechanized equipment for civil construction is assured.

Iron wheels slowing speed, mechanical parts unprotected from dust and mud, wick or brush lubrication, heavy, cast frames involving excessive use of metal, all these must be absolutely done away with. Trailer machines must have pneumatic tires. The machines must be light and small, construction being based on the principle of the interchangeability of parts and members to facilitate repair and the supply of spares.

Using higher standards for permissible stresses, the use of high-grade steels and light alloys, the introduction of welding and pressure casting on a wide scale should assure low weight and small over-all dimensions.

Working parts should be protected and lubrication should be reliable, pressure lubrication being adopted in important places. Controls should be convenient with automatic operation where feasible.

In the interests of large quantity (krupposeriyniy) production and subsequent operations, repair, spare-part supply, training personnel, the number of road-machine types should not be increased excessively without cause, but limited to those really necessary.

The main road machines produced in large quantities and suitable for the priority assignments already referred to are trailer graders and autograders, rollers, bulldozers, scrapers, harrows, and snowplows.

In addition, mobile machines to soak the carriageway surface of finished "black" roads with binding bituminous materials and a complet series of transportable machines for building roads with asphalt surfaces are needed.

Wood-sawing machines are required for building rayon roads with wooden surfaces. With a reasonable amount of felling, wooden surface roads provide good communication through difficult wood and bog areas within a rayon. Wood-sawing machines are also needed when building artificial structures on roads.

To assure machine repair, mobile shops on trucks and trailers should be produced and utilized, and an extensive network of permanent shops should be developed.

The home-produced heavy modernized grader is a good machine. It must be produced on pneumatic tires to increase its usefulness.

The occasional breaking of frames should receive the attention of the manufactures and especially of production engineers.

Medium graders should also be produced, but certainly not at the expense of heavy-grader production.

Medium graders can be used on repair work only, and then only under comparatively easy conditions. In any case, medium-grader production is not a first priority.

A heavy autograder is essential, as light ones have not proved satisfactory under the severe conditions of repair and construction work.

The PRK trailer-roller works well and three can be coupled together. On the other hand, it has no means of propulsion, not even the arrangement provided on the PRK-5 roller.

The PRK-4 roller should be produced with a similar arrangement.

Cam rollers should be produced in a definite proportion, together with smooth rollers with integral underframes. In addition, tests should be made of corrugated rollers and rollers on pneumatic tires.

Harrows should be of the rotary type, but should not have fluid drive, as in this case the drive is used to perform an easy operation (control of the detent?).

Heavy trailer graders are best fitted with mechanical drive and autograders and bulldozers with fluid drive.

The bulldozer is an extremely useful and, indeed, a necessary machine for road work, especially in repair operations. Bulldozers were used extensively on World War II fronts by the English and the Americans.

The basic snow remover should be a fast-running rotary plow mounted on caterpillar tracks. Trouble due to bank formation after the passage of terracing plows is eliminated by using rotary snow removers.

Considerable experience in coping with deep snowdrifts on roads where traffic cannot be stopped during operations show that snow-removing machines must be mounted on fast-moving caterpillar tracks, as a large amount of snow removal must be carried out in nonlevel areas where wheel drives, even those with extra good road-holding capacities, are impractical.

In addition to the SP-5, the SD-1, and other scrapers for various building operations, in particular, for constructing large embankments, the SB-5 scraper with rear discharge is also necessary for repair work, (filling up craters, pits, etc.)

The following wood-sawing machines, used by engineers and road squads, are most useful in highway construction: the RPSh wood saw and the LKR circular saw. They should be mounted on pneumatic tires.

The small IR-84 wood saw with output of 15-20 cubic meters per shift, weight up to 2 tons, is very useful on small projects, and can be transported by truck. However, experience has shown that the wooden frame is loosened by frequent trips over bumpy roads. Such saws should be built with welded metal frames in the future.

Mobile machines are required for building concrete roads: mobile concrete mixers, stonecrushers, mobile belt transporters, and other units. Taken together, these constitute a mobile concrete plant which can be set up quickly on the site.

All machines in this group should be easy to handle and mounted on either pneumatic tires or trucks and tractors. Hitherto almost all road squads have been using ordinary building machines although conditions of operation differ -- machines on industrial and dwelling sites are stationary whereas frequent shifts are necessary in road work.

In conclusion, something should be said about means of propulsion for road machines. The use of old agricultural tractors with small tractive force and low speed, unsuitable for long journeys, is inadmissible. Modern road machines should be drawn by fast and powerful caterpillar tractors.

Finally, power unit supply must be properly organized. From now on, the engines used to drive both the stationary and mobile units should not be chosen at random. There should be a small series of engines -- bearing in mind the general tendency to change to Diesel. Gas generator and steam installations for road squads who work under varied and changing conditions, are not to be relied upon too heavily.

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